

(19) World Intellectual Property
Organization
International Bureau



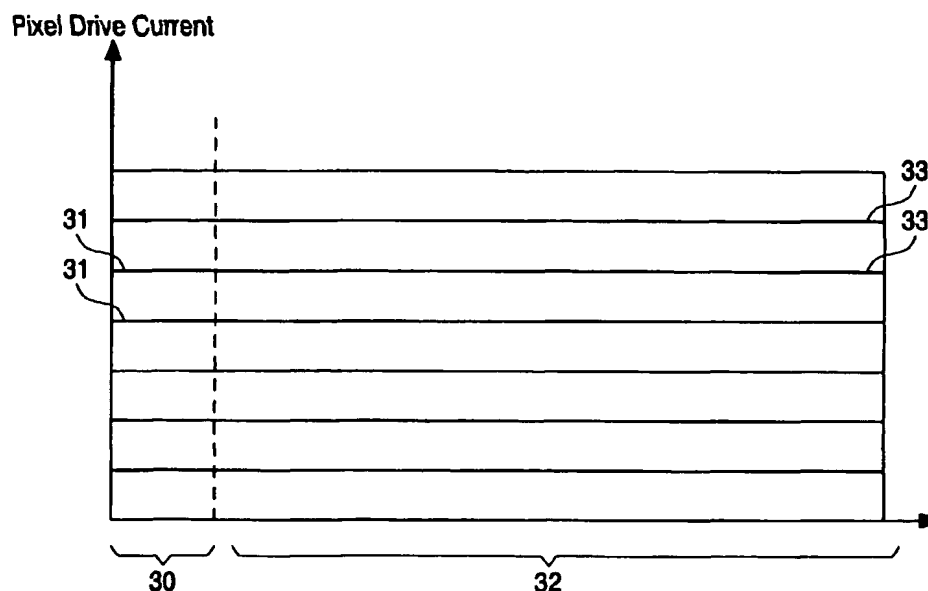
(43) International Publication Date
19 February 2004 (19.02.2004)

PCT

(10) International Publication Number
WO 2004/015668 A1

- (51) International Patent Classification⁷: **G09G 3/32**
- (21) International Application Number: **PCT/IB2003/003204**
- (22) International Filing Date: **22 July 2003 (22.07.2003)**
- (25) Filing Language: **English**
- (26) Publication Language: **English**
- (30) Priority Data:
0218172.5 **6 August 2002 (06.08.2002)** **GB**
- (71) Applicant (*for all designated States except US*): **KONINKLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]**; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).
- (72) Inventors; and
- (75) Inventors/Applicants (*for US only*): **CHILDS, Mark, J.** [GB/GB]; c/o Philips Intellectual Property & Standards, Cross Oak Lane, Redhill, Surrey RH1 5HA (GB). **FISH, David, A.** [GB/GB]; c/o Philips Intellectual Property & Standards, Cross Oak Lane, Redhill, Surrey RH1 5HA (GB).
- (74) Agent: **WILLIAMSON, Paul, L.**; Philips Intellectual Property & Standards, Cross Oak Lane, Redhill, Surrey RH1 5HA (GB).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**
— *with international search report*
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: **ELECTROLUMINESCENT DISPLAY DEVICE TO DISPLAY LOW BRIGHTNESS UNIFORMLY**



(57) Abstract: An electroluminescent (EL) display device has current-driven pixels and is operable in at least two phases within each frame period. In one phase, one of a first plurality (31) of analogue drive currents can be driven through EL display element. In another longer phase, one of a second plurality (33) of analogue drive currents is independently driven through the EL display element. This device combines a time ratio method with an analogue drive scheme. A shorter phase may provide the higher resolution (smaller) increments and one longer phase may provide lower resolution (larger) increments. Low brightness outputs can be achieved with a higher drive current, but over a short duration, which reduces non-uniformity in the pixel output.

WO 2004/015668 A1

INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP 03/03204

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G09G3/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G09G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 717 446 A (EASTMAN KODAK CO) 19 June 1996 (1996-06-19) page 5, line 9 - line 14; figure 1 ---	1-12
Y	US 6 094 243 A (YASUNISHI NORIO) 25 July 2000 (2000-07-25) column 14, line 16 -column 16, line 35; figure 4; table 1 column 2, line 43 - line 49 column 2, line 53 - line 58 column 2, line 66 -column 3, line 5 -----	1-12

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

Z document member of the same patent family

Date of the actual completion of the international search

3 November 2003

Date of mailing of the international search report

12/11/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Gundlach, H

INTERNATIONAL SEARCH REPORT

Internat Application No
PCT/JP 03/03204

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0717446	A	19-06-1996	US 5684365 A	04-11-1997
			EP 0717446 A2	19-06-1996
			JP 8234683 A	13-09-1996
US 6094243	A	25-07-2000	JP 9319342 A	12-12-1997
			KR 246150 B1	15-03-2000
			US 6229583 B1	08-05-2001